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## THE NORTHEAST

According to the Tung-san-sheng Ching-chi Tiao-ch'a Shu (Economic Survey of the Three Eastern Provinces), Liaotung, Kirin, and Heilungkiang have a total of 210 million shih-mou of unused land. An economic survey made by Nan-k'ai University stated that there are more than 200 million shih-mou of unused land in the Northeast. The Japanese Itachi Shogoro estimated that arable land in the Northeast was distributed as follows:

<u>Province</u>	<u>Arable Land</u>	<u>Cultivated Land</u>	<u>Unused Land</u> (in shih-mou)
Liaoning	125,853,682	83,411,472	42,442,210
Kirin	101,093,697	56,390,626	44,703,071
Heilungkiang	134,772,583	47,697,477	87,075,106
Total	361,719,926	187,499,575	174,220,387

The book Tung-san-sheng Chi-lueh (Sketch of the Three Eastern Provinces) stated that unused land, from north to south, is distributed as follows:

1. Right bank of the Argun River, including Hu-lun and Lu-p'in hsiens and Chi-la-lin Preparatory Hsien
2. The northeast area along the right bank of the Amur River, including Ai-hun and Hu-ma hsiens and Mo-ho Preparatory Hsien
3. The southeast area along the left bank of the Amur River, including Lo-pei, T'ang-yuan, and T'ung-ho hsiens
4. The left bank of the T'u-men Chiang, including T'ing-chi, Hun-ch'un, Wang-ch'ing, and Ho-lung hsiens
5. The upper reaches of the Mu-tan Chiang, Sui-fen Ho, and Mu-leng Ho, including Ming-an, Tung-ning, and Mu-leng hsiens
6. The left bank of the Wu-su-li Chiang and the right bank of the Hun-t'ung Chiang, including Mi-shan, Hu-lin, Jao-ho, Sui-yuan, and T'ung-yuan hsiens
7. The basin of the T'ao-erh Ho and Huo-lei Ho, including T'ao-nan, T'ao-an, K'ai-t'ung, An-kuang, T'u-ch'uan, and Chen-tung hsiens
8. The right bank of the upper course of the Yalu River, including Ch'ang-pai, Lin-chiang, An-t'u, and Fu-sung hsiens

## Agricultural Conditions in Settlement Areas in the Northeast

<u>District</u>	<u>Climate</u> (degrees C)	<u>Av Temp</u> Apr-Oct (degrees C)	<u>Products</u>	<u>Frost-Free</u> <u>Period</u>	<u>Rainfall</u> (mm)	<u>Soil</u>
Lower Liao Ho irri- gation area	Warm, 10 to 8	16	Kaoliang, soy- beans, cotton, tobacco, corn, silkworms, miscellaneous garden products	140-200 days	500-900	Brown loam, light cal- careous soil, al- luvial soil

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<u>District</u>	<u>Climate</u> (degrees C)	<u>Av Temp</u> <u>Apr-Oct</u> (degrees C)	<u>Products</u>	<u>Frost-Free</u> <u>Period</u>	<u>Rainfall</u> (mm)	<u>Soil</u>
NE Liaotung dry-farming area and the irrigated areas of Sungkiang and Kirin	Moderate, 8 to 6	15-16	All products, especially soybeans	145-160 days	550-800	Humus and gray loam
Liaosi and Inner Mongolian dry-farming areas	Moderate and dry, 6 to 4	12-16	Products that will stand dry saline soils, hemp, kaoliang, millet	130-170 days	300-500	Sandy prairies and saline soils
NE and SE Sungkiang dry-farming areas	Cool, 4 to 2	12-15	Wheat, soybeans, kaoliang, and millet, in that order	120-140 days	400-500	Gray loam, brown loam, light calcareous soil
NE and SE Heilungkiang dry-farming areas	Cold, 4 to 2	10-13	Grains, soybeans, millet, corn, and other early ripening crops	110-140 days	450-550	Southern part, dark brown soil; most areas, forest-type light gray soil; moist areas, acid soil
Jehol farming and grazing area and Western Heilungkiang-Inner Mongolia farming and grazing area	Very cold, 0 to -2	10	Grains, buckwheat, potatoes	110 days	350-450	Black calcareous soil, brown calcareous soil, gray-brown loam
NW Heilungkiang-Inner Mongolia grazing area	Dry, 2 to 0	10	Hay, grass	110-120 days	350	Brown and light brown calcareous soils and alkaline soils

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There are certain limitations on the increase in the amount of irrigated land. In southeastern Kansu, along the T'ao-hui and Huang-hui canals, irrigation is limited by the topography and does not exceed 10,000-20,000 mu. The level land to the west of the Yellow River is extensive and water sources are comparatively plentiful. Here the construction of dikes and reservoirs could increase the amount of irrigated land.

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In Suiyüan and Ningsia, within the bend of the Yellow River, construction of reservoirs and repair of the ditches could result in a great increase in the amount of irrigated land. In southern Sinkiang, at Korla near Karashahr, the water of the Bagrash Köi is used for irrigation. The I-li region of northern Sinkiang west of Ching-ho is the richest irrigated region in Sinkiang. The irrigated area here can still be considerably increased. This area uses the water of the I-li Ho, the T'e-k'o-ssu Ho, and the K'ung-nai-ssu Ho for irrigation.

In the Turfan area, west of Ha-mi, the use of hillside tunnels as sources of irrigation water is quite general.

In Tsinghai and Sinkiang the number of cattle can be almost doubled but various kinds of feed must be grown. For this reason, part of the grazing land must be planted.

Unused arable land in the Northwest is distributed as follows:

## 1. Jehol

Eastern Jehol: Ch'eng-te, P'ing-ch'üan, Ling-yüan, Chao-yung, and Ch'ih-feng hsiens; 2 million mou

Western Jehol: Luan-p'ing, Feng-ning, and Wei-ch'ang hsiens; 3 million mou

## 2. Chahar

Southern Chahar: K'ang-pao and Shang-tu hsiens; 5 million mou

Northern Chahar: To-lun and Pao-ch'ang hsiens; 5 million mou

## 3. Suiyüan

Eastern Suiyüan: Hsing-ho, Chi-ning, T'ao-lin, and Feng-chen hsiens; 2 million mou

Southern Suiyüan: I-meng and Tung-sheng hsiens; 5 million mou

Northern Suiyüan: Wu-tung, Wu-hsi, Ku-yang, and An-pei hsiens; 6 million mou

Western Suiyüan: Hou-t'ao, Wu-yüan Hsien and Lin-ho Hsien; 9 million mou

## 4. Ningsia: Hsi-t'ao [eastern Ningsia]; 2 million mou

## 5. Kansu: Western corridor; 5 million mou

## 6. Tsinghai: Tsaidam Basin and other warm valleys; 5 million mou

## 7. Sinkiang:

Ha-mi area; one million mou

Karashahr-Korla area; 3 million mou

Urumchi and Sha-wan area; 2,500,000 mou

Kuldja area; 2,500,000 mou

Chuguchak area; one million mou

Sharasume area; one million mou

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The total unused arable land in the Northwest amounts to 60 million mou. Considering as an average figure that 8 mou can support one person, the population of the Northwest could be increased by 7,500,000, that is, by more than one third of the present population. The natural annual increase of eight persons per thousand will make up a part of this deficiency over the next 20-30 years and still allow 20,000 households, or 100,000 people per year, to be settled in this area. The necessity for drawing a large number of workers to the Northwest as mining and industry develops is another matter.

Conditions in the settlement areas of the Northwest are as follows:

1. The eastern Jehol plateau dry-farming area lies on both banks of the Ta-ling Ho and belongs to the three Kharchin Mongolian banners. Rainfall is from 400 to 600 millimeters and the average temperature from April to September is 21.2 degrees centigrade.
2. The western Jehol plateau dry-farming area is in the upper Luan Ho region and also belongs to the three Kharchin banners. The rainfall scarcely exceeds 400 millimeters and the average temperature from April to September is about the same as in eastern Jehol.
3. The Chahar dry-farming area is in southern Chahar adjacent to Jehol and the natural conditions are similar. In the northern Chahar highlands, the rainfall is 200 millimeters and the average temperature from April to September is 14.6 degrees centigrade. The growing season is short and wind erosion is very serious. If the area is maintained as a grazing region, its production can be increased by improvements in types of cattle and pasturage. At the same time, by rotating crops, some grassland can be used to supply food for both people and cattle.
4. The eastern Suiyuan Basin dry-farming area is east of Kuei-sui. Although its extent is small, its agricultural production is abundant and the population is comparatively dense. The yearly rainfall does not reach 400 millimeters; the average temperature from April to September is 17.5 degrees centigrade. Improvements in irrigation can increase the amount of arable land only slightly.
5. The northern Suiyuan highland grazing area lies north of the Ta-ch'ing Shan. Temperatures here are somewhat below those of eastern Suiyuan, the land is favorable for grass, and cattle and sheep are raised as in nearby northern Chahar. The southern part of the area is suitable for cultivation and has already been divided into hsiens to receive settlers.
6. The southern Suiyuan sandy and rocky dry-farming area is close to Kansu and Shensi. The soil is sandy, rocky, and saline; the average annual rainfall is only 180 millimeters and is irregular. In the mixed farming and grazing districts, only millet and other crops capable of withstanding drought and alkaline soils can be grown.
7. The western Suiyuan plain irrigated area is a level plain with scanty rainfall, the yearly average being about 200 millimeters. Only the Yellow River flows through it forming its great bend. By means of irrigation, production is fairly high but the great quantity of silt carried by the Yellow River causes difficulties. Control of the Yellow River and improvement of the ditches could increase considerably the amount of arable land.
8. In the Ningsia plain irrigated area, the annual rainfall is scarcely more than 200 millimeters and the region is dependent on the Yellow River for water for irrigation. If river control and irrigation projects were carried out below Ch'ing-t'ung-hsia and the land east of Ho-lan-unan were opened as an

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irrigated district, the cultivated land could be extended to support settlers. In addition, the average temperature from April to September is 19.2 degrees centigrade which is warmer than the 17.2 degrees centigrade at Kuei-sui and it is possible to grow paddy rice.

9. The Kansu western highland irrigated area is in the Kansu western corridor, west of Wu-shao-ling, and the annual rainfall is only 100 millimeters. Irrigation depends on snow runoff from the Ch'i-lien Shan or underground water from a water-bearing gravel stratum. At present, because the old ditches have not been repaired and few new ditches have been opened, a fairly large amount of land has gone out of use, but if old ditches are repaired and new ones opened, the cultivated area could be increased.

10. The Tsaidam Basin dry-farming area in Tsinghai has a high elevation and temperatures are low. At Hsi-ning the average temperature from April to September is 14.8 degrees centigrade, the annual rainfall is 354.3 millimeters, and becomes less toward the west. At Lan-chou, temperatures are more moderate while rainfall is greater. Soil in low places is often saline but in the warmer valleys there are water sources and Chinese and Tibetan settlers. Water sources are not fully utilized, however, and arable land can be somewhat expanded. The Tsaidam Basin is especially suitable for development by using a mixed farming and grazing system.

11. Irrigated oasis areas and mountain farming and grazing areas in Sinkiang have a high elevation and there is much wasteland. Steep sloped, sand dunes, and salt flats are everywhere. In southern Sinkiang, the annual rainfall is less than 100 millimeters while in northern Sinkiang it is about 300 millimeters. The April-September average temperature at Urumchi is 17 degrees centigrade and in southern Sinkiang it is relatively higher. The need for irrigation using snow runoff, mountain streams, and ground water is much more pressing in southern Sinkiang than in the north. If facilities for transferring water were rebuilt and put in order everywhere, the arable land could be greatly increased. In the Tien Shan east from Ha-mi north of the Tarim Basin, the climate is moist and the valleys are fertile. This is a famous grazing area which could be further utilized for agricultural purposes.

There are many areas in the Northwest where farming and stock raising are combined. The chief animals raised are sheep, horses, cattle, and camels, in that order. In addition, crops are grown that require little water, such as wheat, corn, millet, and rape to provide food and also as cash crops.

In the Ch'a-han-ch'ü Ho, farming and grazing district of the Yen-ch'i and Ho-shih area, where 10,000 catties of seed are planted annually, wheat accounts for 6,000 catties, corn 1,000 catties, millet 2,000 catties, and rape 1,000 catties. At the same time, 2,500 sheep, 300 horses, 140 cattle, and 20 camels are raised. The buildings of the district include 16 dwelling houses and nine Mongol yurts. In this area men are hired to plow the fields and tend the animals.

The Mongolian Tang-te-erh grazing district is located at Ho-ching Hsien in Sinkiang. The following animals are being raised in this district: 1,000 sheep (10 rams, 600 ewes, 200 gelded sheep, and 190 lambs), 800 horses (26 stallions, 500 mares, 100 geldings, and 174 colts), 150 head of cattle (3 bulls, 80 cows, 20 steers, and 47 calves); one third of the cattle are yaks. Three men are employed in tending horses, two for sheep, and one for the cattle.

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## THE SOUTHWEST

The unused land in the Southwest is distributed as follows:

The T'ung-nan-pa dry-farming area in northern Szechwan has reddish soil and yellow loam and the annual rainfall is 600-800 millimeters. The principal crops are wheat, corn, and sweet potatoes. Because of the military activity, the population has declined sharply and some land has gone out of use. If cultivation could be resumed and a crop rotation system employed to prevent erosion and maintain fertility, the arable land could be increased considerably. However, unused land occurs in scattered pieces and there are no extensive areas available.

The north part of the northern plain area in western Szechwan includes P'ing-wu and Pei-ch'uan on the upper Fu Chiang, and Sung-p'an and Li-fan on the upper Min Chiang. The annual rainfall in both places is from 400 to 600 millimeters and the climate is very cold. Only wheat, peas, rape, and root crops are grown. The extreme western part of the area is suitable for grazing.

The area in southwestern Szechwan bounded by Lei-po, Ma-pien, P'ing-shan, and O-pien has a rainfall of 1,000-1,200 millimeters annually but the land is mountainous and arable land occurs only in small, scattered places. Paddy rice and wheat are grown in the level places and corn and potatoes on the slopes. In developing the area, forestry, farming, and grazing should be combined.

The area in southeastern Szechwan, including Yu-yang, hsiu-shan, Ch'ien-chiang, and P'eng-shui, is hilly country with an annual rainfall of 1,200 to 1,400 millimeters and reddish soil. The arable land is scattered and limited in extent, therefore it is suitable for forestry as a principal occupation with farming as supplementary.

Southeastern Sikang has a rainfall of 1,000 to 1,200 millimeters annually. Most of the land is heavily forested mountains and the soils are poor except on the alluvial plains of rivers. Conditions vary greatly throughout the area but with water conservation, the future development of agriculture in the fertile valley bottoms would be very great.

The northern Sikang grazing area is on the high plain of northern Sikang and is level and extensive, but because of the high altitude the climate is cold. The annual rainfall is 400-600 millimeters and the growing season is less than 120 days. Grass is abundant and the area is very suitable for grazing. Hay and potatoes are grown but only enough to provide food for the people and a part of the feed for the animals.

The central Sikang grazing area surrounds I-tun and Li-hua. The rainfall is 400 to 600 millimeters annually and the altitude is over 4,000 meters so there is comparatively little opportunity for agriculture but it is hoped that grazing will be a major occupation. Yaks and Tibetan sheep are well suited to the area.

The Pa-an Basin agricultural area in central Sikang is a broad basin with an area of about 1,000 square Chinese li at an altitude of from 2,600 to 3,000 meters. It is more than 1,000 meters lower than the Li-hua and I-tun area. South of Pa-an the basin extends to Kung-k'a on the border of Te-jung Hsien. In the vicinity of Pa-an, farming is carried on and paddy rice could be grown if adequate water were furnished.

The Ssu-mao and P'u-erh forest and farming area of Yunnan includes Ssu-mao, P'u-erh, Ch'e-li, and Fo-hai. Soils are reddish and fertile and rainfall is abundant. For example, at Ch'e-li the elevation is between 400 and 500 meters

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and rainfall is about 1,600 millimeters so that the locality is very favorable for farming. Even though the flow of water is very swift and much soil is eroded, proper maintenance methods adapted to the climate would make possible forestry and farming. Elimination of malaria in the area would allow settlement and cultivation of the land. The climate of Yunnan is marked by seasonal rains and in the dry season there is no rain for the transplanting of rice plants or for irrigation. The ground becomes hard as iron and plowing is impossible. In the rainy season, the rainfall is excessive and the water cannot drain away so low places are flooded. The control of water is a major problem in expanding the arable land.

The Liang-ho, Ying-chiang, Lu-hsi area in western Yunnan; the Chien-ch'uan, Hao-ch'ing, Lan-p'ing area in northern Yunnan and the Sung-ming, Mi-lei, K'ai-yüan area in southern Yunnan have already been settled but because of lack of water and the instability of the government, much land is still going to waste. In the northern area, the elevation is 2,000-3,500 meters above sea level and the annual rainfall is from 1,000 to 1,200 millimeters. Products include corn, wheat, buckwheat, and hay. The valley bottoms in the southern area are at an elevation of 500 to 3,000 meters above sea level. The area is on the border of the temperate and tropical zones and has a growing season of 240 days or more. Tree cotton, paddy rice, pumpkins, hemp, tobacco, corn, barley, and wheat can be grown. On the valley slopes at 3,000 to 4,000 meters elevation, the growing season is somewhat shorter. Where the season is less than 200 days, the principal crops are wheat, barley, peas, buckwheat, and potatoes although some paddy rice is grown.

The Kuei-yang and Tsun-i dry-farming area is in central Kweichow and the Tu-chün and Tu-shan area is in southern Kweichow. The soil in central Kweichow is yellow loam and in southern Kweichow is yellow-red loam. The land consists of level spaces and slopes at elevations from 300 to 3,000 meters. Because of topographical limitations, unused arable land is not very extensive.

The western Kweichow forest and grazing area is west of An-shun where the country is very mountainous and suitable for forestry and grazing. The cultivated land produces few agricultural products.

In northwestern Kwangsi, west of the Hunan-Kwangsi Railway, the size of unused land areas varies from thousands to hundreds of thousands of mou. The mean annual temperature is from 18 to 20 degrees centigrade and the annual rainfall is from 1,400 to 1,600 millimeters. Although weather conditions are favorable, the soil is poor and rocky and does not retain water so that production is slight. Because of the sparse population, labor is lacking and also capital and fertilizer. The people resort to such unfavorable practices as burning off the grass on the slopes. If attention is given to improvement of the soil and proper fertilization, and additional manpower is brought in, the arable land of Kwangsi can be greatly increased.

SEACOAST AND ISLANDS

The coastal area is largely devoted to producing salt and is composed of alluvial saline soils. As the shore expands outward, improvement of the soil will make cultivation possible. The six coastal provinces from Hopeh to Kwangtung all have this saline alluvial soil, of which only a small portion is needed for salt production, so that most of the area is available for reclamation. The temperature and rainfall are suitable for cultivation but the presence of so much salt and the growth of reeds and rushes creates wasteland. The first step in making use of these lands is the construction of sea walls to prevent flooding by sea water which not only inundates the countryside but also makes

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it impossible to grow anything on the land for many years. This construction of sea walls is extremely important to the economy of Kiangsu and Chekiang and maintenance of such walls is one of the important functions of the provincial governments. Even if the sea water is kept off the land, however, it is still necessary to eliminate the salt in the soil, therefore, the next step is to provide fresh water to leach the soil. This can be done by rain water seeping through the soil, by allowing fresh water to flow over the land, or by using machinery and electric power to distribute fresh water in order to get rid of the salt. Afterward, crops that can tolerate a saline soil, such as cotton, rice, grains, and alfalfa may be grown.

The following table shows size and distribution of seacoast and island areas suitable for reclamation:

<u>Province</u>	<u>Location</u>	<u>Total Area (mou)</u>	<u>Previously Reclaimed (mou)</u>	<u>Not Yet Reclaimed (mou)</u>
Hopeh	Po Hai coast	4,500,000	320,000	4,180,000
Shantung	Delta of the Yellow River	550,000	50,000	500,000
Kiangsu	Northern Kiangsu,	22,000,000	6,000,000	16,000,000
	Sung-chiang	400,000	256,000	144,000
Chekiang	North and south	3,000,000	2,000,000	1,000,000
Fukien	Hsia-p'u, P'u-t'ien, Lung-ch'i	1,000,000	998,760	
Kwangtung	Canton area	5,650,000	3,500,000	2,150,000
	Lei-chou Peninsula	5,400,000	[400,000]	5,000,000
Taiwan	Eastern Taiwan	3,000,000	1,800,000	1,200,000
Hainan		5,700,000	[3,000,000]	2,700,000
Total		51,200,000	18,324,760	32,874,000

The following table shows temperature and rainfall in seacoast areas:

<u>Place</u>	<u>Latitude</u>	<u>Annual Mean Temperature (degrees C)</u>	<u>Apr - Sep Ave Temp (degrees C)</u>	<u>Annual Mean Rainfall (mm)</u>	<u>Apr - Sep Ave Rainfall (mm)</u>
Tientsin	39 9	11.98	21.4	495.9	448.8
Chih-fou	37 33	12.52	20.9	587.8	471.3
Fou-ning	--	14.69	--	739.9	654.6
Nan-t'ung	--	14.34	--	970.1	757.7
Ning-po	29 57	16.56	23.1	1331.0	866.0
Foochow	25 59	20.11	25.3	1666.2	1052.1
Amoy	24 27	21.84	26.0	1175.7	825.9
Swatow	23 23	21.89	26.1	1508.5	1157.4
T'ai-nan	25 15	22.04	26.4	1677.0	--

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Using the average figure of 4 mou for the support of one person, the 51,200,000 mou of land available for reclamation in coastal and island areas will allow an increase of 12,800,000 in population. Development of these lands will eliminate the necessity for emigration and permit the coastal provinces to take care of their own surplus population.

Agricultural reclamation projects in 1950, in the Po Hai coastal area, were as follows:

At the Kao-li State Farm along the lower Chi-yün Chiang in Ning-ho Hsien, Hopeh, water conservation installations included two water-distribution devices, 7 electric pumps, 170,000 cubic meters of irrigation ditches, 81 bridges, more than 800 large and small watergates, and more than 300 farm buildings. Farm implements included 26 tractors and more than 90 other pieces of equipment such as combines, harrows, and seed drills. This farm had 44,000 mou of wet and dry fields under cultivation. Prescribed missions of the farm were to mechanize cultivation completely; to follow a 6-year experimental rotation cycle with paddy rice, cotton, and alfalfa as the chief crops; and to carry out the method of deep plowing and close planting with rotation of wet and dry cultivation.

The Huang-hua State Farm south of Tientsin between the Po Hai and Ts'ang Hsien, had 84 head of livestock for breeding purposes. The low-lying land makes drainage difficult. There was a total of 5,230 mou of arable land of which 3,800 mou were under cultivation. The prescribed missions of this farm were to carry out leaching of alkaline soil, the clearing of silt, and the intensive raising of livestock.

The Chün-liang-ch'eng Experimental Farm had a total of 597 mou of farm land. The mission of this farm was to conduct experiments in selecting varieties of plants and in methods of combating insects.

This area includes eight cooperative farms; Chün-liang-ch'eng, Chang-huang-chuang, Hsiao-chan, Ching-nan, Ching-chiao, Ch'a-tien, Wu-feng, and Po-ko-chuang. These eight farms had more than 1,000 wagons and water carts. Land already reclaimed amounted to 235,000 mou which was cultivated by 18,900 households with a total population of 91,900 of whom 40,980 comprised the labor force. These farms had three missions: (1) to repair all types of water conservation installations, (2) to distribute seed and fertilizer loans, (3) to strictly prohibit subletting and subleasing and to eliminate extortion of the new "fixed bonus."

The Lu-t'ai and Yang-liu-ch'ing electrified water conservation stations irrigated 37,000 mou of land for farmers. Their mission was to solve the leaching and irrigation problems of individual farmers.

The Ching-chiao tractor station had six tractors and several dozen other implements while the Ching-chiao horse-drawn plow station had 28 plows and 56 animals. Together these stations plowed and cultivated more than 6,000 mou for farmers.

In 1950, land already reclaimed in the Po Hai area amounted to 226,000 mou of irrigated fields and 88,000 mou of nonirrigated fields, or a total of more than 314,000 mou. This was one third greater than the 240,000 mou available in 1949. It is expected that food production this year will be 113 million catties. Water conservation installations, since last year, include several dozen electric water distribution stations repaired and expanded, 143 electric machines of various types, 40 transformers, and 245 electric pumps. The volume of water is sufficient to irrigate more than 350,000 mou.

A five-year plan for the Po Hai Area has been proposed by the Agricultural Reclamation Bureau. The plan runs from 1951 through 1955 and has as its main object the rapid reclamation of 1,200,000 mou of wasteland thus increasing the

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present 320,000 mou of agricultural land to more than 1,500,000 mou. This represents 36 percent of the total unused land in the Po Hai area. The plan also proposes development of water conservation works, establishment of state farms, preparation of farm implement stations and training of operators, use of scientific methods to improve soil fertility, raising of improved varieties of plants and animals, establishment of nurseries for tree seedlings, and other measures to enrich the Po Hai area. Other concrete plans include the organization of available labor for production, the establishment of agricultural cooperatives and the development of secondary occupations.

#### UNUSED LAND IN THE INTERIOR

Unused land in the interior is interspersed with cultivated land and does not resemble the other undeveloped areas; however, these separate pieces may be considered together for purposes of comparison.

Listed below are the size and distribution of interior unused land areas.

<u>Province</u>	<u>Location</u>	<u>Type of Land</u>	<u>Size (mou)</u>
Kansu	Southeastern Kansu mountain Area	River shore	1,500,000
Shensi	Valleys of the Han Chiang and Wei Ho watersheds	River shore	2,000,000
	Northern and southern Shensi mountain areas	Mountainous	5,000,000
Honan, Anhwei, Kiangsu	Old Yellow River area	Plain	14,000,000
Anhwei, Kiangsu	Anhwei-Kiangsu mountain area	Mountainous	5,000,000
Hupeh, Hunan, Anhwei, Kiangsu	Areas along the lakes and the Yangtze River	River and lake shore	3,500,000
Kiangsi	Eastern and southwestern Kiangsi	Both level and mountainous	30,000,000
Fukien	Northwestern Fukien mountain area	Mountainous	1,000,000
Kwangtung	Northern Kwantung mountain area	Mountainous	22,000,000
Total			84,000,000

Although all of this land is considered to be arable, different methods must be used in developing it. About one half is suitable for farming, one quarter for grazing and raising feed, and one quarter for forestry. Using the average figure of 6 mou for the support of one person, this land will permit an increase in population of 14 million. The figure of 6 mou per person is based on the considerations that fertilization of sandy areas will restore them to productivity and that two harvests per year are possible south of the Huai Ho Basin. These factors are combined with the products of grazing and forestry to arrive at the average.

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The following is a summary of conditions in the interior reclamation areas.

1. The southeastern Kansu mountain area includes the headwaters areas of the Ching Ho, Wei Ho, Min Chiang, Pai-lung Chiang, and T'ao Ho and lies at an elevation of about 3,000 meters. Where the valley bottoms are wide and level, protective works can be built along both banks of the river and sandy areas can be made fertile. Where level land along the rivers is less than 10 meters wide, the arable land cannot be expanded. The mean annual rainfall at Min Hsien is 623.4 millimeters and is concentrated in July, August, and September. The highest July temperature is 18.1 degrees centigrade and lowest January temperature is 3.5 degrees centigrade <sup>/sic/</sup> with an annual average of 7.9 degrees centigrade. The frost period is from 6 to 7 months long; but even in July and August there is danger of damage from killing frosts and hail.

2. Along both banks of the Wei Ho in Shensi, from T'ung-kuan to Pao-chi, there are more than one million mou of river shore lands and along the Han Chiang from Wu-hou Chen in Mien Hsien to Lung-heng in Yang Hsien and the Ta-lung Ho there are more than 500,000 mou of river shore lands at an average elevation of 2,500 meters. By the use of sedimentation measures these can be made into productive land. Before these measures can be put into effect, however, there must be a detailed water conservation survey and sound plans must be made.

3. The following mountainous areas in Shensi have wasteland from which some land may be reclaimed:

<u>Area</u>	<u>Amount of Wasteland (mou)</u>	<u>Recoverable Portion</u>
Huang-lung Shan	2,400,000	One third
Li-p'ing (Ta-pa Shan)	200,000	One tenth
Ch'ien Shan	500,000	One half
The foot of T'ai-pai Shan	150,000	Three tenths
Ma-lan	2,000,000	One third
Ts'o-o Shan	30,000	One half
Total	5,280,000	

In reclaiming mountain land, there is a serious problem of erosion so that the first step must be measures to retain the soil.

4. Areas in Honan, Anhwei, and Kiangsu were flooded by the Yellow River when the Japanese opened the dikes at Hua-yuan-k'ou in 1938. The dikes were repaired in 1947 and the flooded area dried up. This area is divided into three sections as follows:

a. Eastern Honan

The sandy river shore areas in eastern Honan are being planted with grass and trees, and cultivation is prohibited in the hope that soil fertility will be increased. In less sandy areas, belts of hay are being planted at right angles to the prevailing winds in order to prevent wind erosion. Most of this area is dry with scarcely 600 millimeters of rainfall, therefore it will be necessary to bring in water for irrigation. Also, the soil is highly alkaline, and fresh water must be supplied for leaching.

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## b. Northern Anhwei

Northern Anhwei consists of an alluvial plain of more cohesive soils. If drainage is improved, this can be made into excellent agricultural land. It will also be necessary to repair the great dike of the Huai Ho to assure productivity.

## c. Northern Kiangsu

Northern Kiangsu between the Tientsin-Shanghai Railway and the Grand Canal is a region of many lakes and ponds. The soil is relatively heavy and suitable for rice growing and the area was once prosperous. Because of inundation from the Yellow River, however, it will be necessary to repair the protecting dikes before restoring the land to cultivation. In the area west of the Grand Canal, the lakes have silted up until the water level is 1-1.5 meters above that to the east of the canal. If the lakes west of the canal can be drained into the saline areas east of the canal, two advantages will result. On the one hand, the lake beds will be changed into productive land; and, on the other hand, fresh water will be provided to remove the salt from saline soil. Before this can be done, however, a detailed survey must be made and plans devised.

5. The Hou-li, T'ien-chu, and Lang-ya hill areas in northern Anhwei are at elevations of 400-1,500 meters above sea level. The rolling hills around Ning-p'u are about 200 meters above sea level and the Chiu-hua, Ch'i-men, and T'un-hsi hill areas in southern Anhwei are about 1,000 meters above sea level. In many of these areas, the people make a practice of burning off the hillsides to clear the land and after many years of this the fertility of the soil has been greatly reduced. These illogical methods must be dealt with drastically. How to utilize terracing and strip planting and the combination of farming with forestry and reforestation must be studied.

6. The shore lands along rivers and lakes are composed of alluvial soils and are therefore very fertile. However, much of this land must be used to retain flood water and is not available for agricultural use. Area of available land is as follows:

<u>Location</u>	<u>No of Mou</u>
Along the Chin Shui in Hopeh	100,000
The Tung-t'ing Hu basin in Hunan	700,000
The P'o-nan basin in southern Kiangsu	300,000
The An-ch'ing lowland in Anhwei	1,000,000
The lake and river shore lands of Kiangsu	500,000

7. Western Kiangsi was severely affected by the war with the result that there has been a labor shortage and cultivated land has fallen into disuse. This is even more true in southwestern and eastern Kiangsi where there are strips of unused land mixed in with cultivated fields. Chi-an, An-fu, T'ai-ho, Wan-an, and Sui-ch'uan hsiens all have large areas of uncultivated red soil lands. This soil is acid and lacks organic material so it will be necessary to fertilize with lime nitrates and phosphates to increase production. In the hill region around Huang-ch'ang, Nan-feng, Nan-ch'eng, and Li-ch'uan hsiens there is a comparable area of unused land which is suitable for reforestation and the growing of hay to supplement the limited crop production.

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8. The northwestern Fukien mountain area includes Ch'ung-an, T'ai-ning, Chien-ning, Ch'ing-liu, Ning-yang, Ming-hsi, Chien-yang, and Shao-wu hsiens. Elevations are from 800 to 2,000 meters above sea level and the topography is very rugged with swift mountain streams everywhere. The land is suitable for forestry and grazing and a limited amount of small-scale agriculture.

9. The northern Kwangtung mountain area includes Lien Hsien, Lien-shan, Ying-te, and Yang-shan hsiens. Elevations are from 400 to 1,000 meters above sea level and the soil is red and acid and suitable for growing tung trees and fruit trees. A small amount of small-scale farming can also be carried on.

#### SOME OPINIONS ON FUTURE OF LAND RECLAMATION

To achieve a planned development of agricultural production in the new China and to solve the pressing problems of the people's livelihood, a comprehensive rational plan for utilization of the land is necessary. To set up this plan it is necessary to have basic figures on the different types of land. The land of China has been used for farming, forestry, and grazing for a very long time but accurate figures on land use are still lacking. The figures available are no more than estimates and these apply largely to agricultural land and neglect forest and grazing land.

The figure of 1,410,731,000 shih-mou of farm land was determined in 1946 on the basis of provincial reports which contained many discrepancies. In the case of wasteland, it is even harder to make a comparison since the figures range from 7,009,565,706 ares as determined by the Statistical Bureau of the former government in 1941 to 21,448,411,000 ares according to an estimate by O. E. Baker in 1918.

In the utilization of wasteland, it is not enough to know the amount and distribution of land; it is also necessary to know whether or not it can be used, how to use it, what systems and techniques of cultivation are best and what improvements are needed before the long-range productivity of the land can be developed. At present, detailed figures on natural conditions in wasteland areas are available only for such places as the northern Kiangsu saline area, the Po Hai coast, Suiyuan, and areas west of the Yellow River. In other places, figures are incomplete or lacking altogether. Surveys of wastelands are therefore urgently needed to provide sound topographical maps, soil maps, weather data, water data, biological information, etc. On the basis of these data, plans can be laid and rational utilization made of the land.

It must be realized that utilization of wastelands involves forestry and grazing as well as farming. Large-scale reclamation operations must take into consideration the following: (1) provision and distribution of capital, (2) acquisition and control of land and determination of boundaries, (3) construction and repair of buildings and roads, (4) irrigation and drainage installations, (5) improvements in sanitation, (6) facilities for defense, (7) transportation of new settlers and allotment of funds, (8) advancement of agriculture, (9) promotion of forestry, grazing, and aquatic production, (10) organization of cooperative societies and purchase and sale of commodities, (11) establishment of medical facilities, (12) promotion of educational and cultural activities, (13) introduction of handicraft industries, (14) arrangements for simple industries, etc.

In developing mountain lands, the effect on lowlands must be taken into account. The removal of natural cover from slopes can allow erosion of the topsoil and excessive silting up of streams and rivers. For this reason, use of

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land on slopes must be subject to certain restrictions. Similarly, the use of fertile shore lands along rivers, lakes, and the seacoast must be controlled so that the construction and repair of dikes and embankments will not intensify the effects of floods. Three methods of flood control are as follows:

1. Reserve a portion of the land as flood-control reservoirs. Winter crops such as wheat or beans can be planted in these areas so that one harvest may be obtained.
2. Provide for the opening of sluice gates to flood certain areas at times of high water. This will result in the loss of a crop but if nine good crops can be harvested for each one lost it will be worth while.
3. Carry out control measures along the upper courses of the rivers to reduce the height of floods.

Present-day expansion has been carried out by two methods, cooperative management and collective management. Cooperative management has been used in the old liberated areas and should serve as a model for the new areas. Collective management is most easily used in opening up previously undeveloped land where the problem of requiring people to give up their own land does not arise.

The selection and training of cadres and settlers are major factors in successful development of new land. People must be informed of the difficulties to be encountered and the proper means of overcoming them.

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